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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,304	10/27/2003	Jian Liu	15436.247.14.1	5109
22913	7590	10/17/2006	EXAMINER BOLDA, ERIC L	
WORKMAN NYDEGGER (F/K/A WORKMAN NYDEGGER & SEELEY) 60 EAST SOUTH TEMPLE 1000 EAGLE GATE TOWER SALT LAKE CITY, UT 84111			ART UNIT 3663	PAPER NUMBER

DATE MAILED: 10/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/696,304

Applicant(s)

LIU ET AL.

Examiner

Eric Bolda

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,4-13,15 and 38-46 is/are pending in the application.
- 4a) Of the above claim(s) 6-9,13 and 43-46 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4,5,10-12,15 and 38-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION*****Election/Restrictions***

1. Applicant's response to the restriction requirement mailed July 25, 2006 was non-responsive. However, election of species with a gain-equalizing filter between two gain sections (as illustrated in Fig. 1) was made by Pete Malen (801-533-9800) on Sept. 13, 2006. Claims 1-5, 10-12, 15, 38-42 read on the species election. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Newly submitted claims 43-46 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the gain equalization filter is configured to pre-compensate the optical signal for gain non-uniformities before receiving gain from any source within the optical waveguide, i. e. the gain equalization filter is not between the two gain sections.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 43-46 withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***Response to Amendment***

3. This Office Action is responsive to Applicant's amendment of May 22, 2006.

***Drawings***

4. The drawings were received on May 22, 2006. These drawings are accepted.

***Response to Arguments***

5. Applicant's argument regarding prior art rejections of all claims have been considered but are moot in view of the new grounds of rejection below.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The limitation "a second one of the at least one gain portion" in lines 9-10 contradicts the statement of "at least one gain portion" on line 3 in the case of exactly one gain portion, so it would be impossible to make the invention. It appears that there must be at least two gain sections.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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9. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "a second one of the at least one gain portion" in lines 9-10. There is insufficient antecedent basis for this limitation in the claim. Note that line 3 of the same claim recites "at least one gain portion" so it is not immediately clear that there must be two gain portions.

***Claim Rejections - 35 USC § 103***

10. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

11. Claims 1, 4, 10-12, 38-40, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Payne (US Pat. No. 5,260,823) in view of Sun (US Pat. No. 6,377,396). Payne discloses in Fig. 5 an optical waveguide comprising at least one gain section (10), and at least one gain equalization filter (12) that is optical coupled to the at least one gain portion. The gain equalization filter portion selectively attenuates wavelengths within the signal band such that the gain of each wavelength in the optical signal is substantially equal (see Abstract). Payne does not specifically recite that the first gain portion is designed to provide a lower-level of amplification than a second gain portion. However, Sun teaches in Fig. 3 an optical amplifier with two gain stages (30) and (32) coupled together with a gain equalization filter (38) between them, and the first gain portion (first stage (30)) is designed, by having a shorter length, to provide a lower level of

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amplification than the second portion (second stage(32)). See 3<sup>rd</sup> col. lines 59-61. It would have been obvious to one skilled in the art (e. g. an optical engineer) to design the first and second gain portions of Payne as in Sun, for the purpose of reducing signal noise.

With regard to claim 4, the gain portions and the gain equalization filter portion of Payne are disposed in a single mode fiber (5<sup>th</sup> col. lines 56-57)

With regard to claim 10, Payne discloses the gain equalization filter portion is formed by a grating (14) mechanically pressed onto the fiber, achieving a core-cladding coupling. Hence it is inherent that the gain equalization filter portion is formed at least in the cladding (5<sup>th</sup> col. lines 55-69).

With regard to claim 11, the fiber is doped with Erbium.

With regard to claim 12, the gain equalization filter can include discrete, distributed, segments along the length of the optical amplifier (Payne, 6<sup>th</sup> col. lines. 61-63)

With regard to claim 38, Sun discloses the filtered signal wavelengths are in the range 1530.33 nm to 1561.42 nm.

With regard to claim 39, the first and second gain portions are on opposite sides of the gain equalization filter (Payne or Sun).

With regard to claim 40, the second gain section of Sun has a longer length (15m) than the first gain section (10m).

With regard to claim 41, the gain equalization filter is configured to pre-compensate the optical signal for gain non-uniformities in the second gain portion, before the light receives gain within the second gain portion.

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12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Payne in view of Sun as applied to claim 1 above, and further in view of DiGiovanni et al. (US Pat. No. 5,659,644). Payne in view of Sun does not specifically disclose that the gain equalization filter portion comprises a UV-written Bragg grating in the optical waveguide. However, DiGiovanni teaches (4<sup>th</sup> col. lines 25-29) a Bragg grating which is UV-written into the optical fiber. It would have been obvious to one skilled in the art (e. g. an optical engineer) to make the gain equalization filter of Payne in the manner of DiGiovanni for the purpose of increasing optical stability of the gain equalization filter.

13. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Payne in view of Sun as applied to claim 1 above, and further in view of Espindola et al. (US Pat. No. 5,920,424). Espindola discloses in Fig. 1 an optical waveguide with two gain portions (13) and (14), and a gain equalization filter (16) that is optically coupled to the gain portions. The gain equalization filter portion selectively attenuates the optical signal wavelengths so that the gains of each wavelength are within 2dB of each other (see Fig. 3). It would have been obvious to one skilled in the art (e. g. an optical engineer) attenuate the optical signal as in Espindola, in the apparatus of Payne as modified by Sun, to minimize the gain ripple.

14. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Payne in view of Sun as applied to claim 1 above, and further in view of Nakazawa (US Pat. No. 5,206,925). Nakazawa teaches in Fig. 1 a rare earth doped waveguide which comprises dopants selected from Er, Sm, or Tm. It

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would have been obvious to one skilled in the art (e. g. an optical engineer) to use these dopants, , in the apparatus of Payne as modified by Sun, to amplify wavelengths in the S-band.

Note that the citations made herein are done so for the convenience of the applicant; they are in no way intended to be limiting. The prior art should be considered in its entirety.

### ***Conclusion***

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Eric Boldt whose telephone number is 571-272-8104. The examiner can normally be reached on M-F from 8:30am to 5pm.



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If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Jack Keith, can be reached on 571-272-6878. Please note the fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EB

Eric Boldt

JACK KEITH  
SUPERVISORY PATENT EXAMINER